DOCUMENT RESUME

ED 297 689 IR 011 902

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TITLE Computer Education Curriculum. Student Goals and Activities, Grade 6, MSAD #5.
INSTITUTION Maine School Administrative District #5, Rockland.
PUB DATE Mar 85
NOTE 86p.
PUB TYPE Guides - Classroom Use - Materials (For Learner) (051) -- Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Computer Literacy; Curriculum Development; Grade 6; Intermediate Grades; Learning Activities; *Microcomputers; Programing; *Resource Materials; Teacher Developed Materials; Teaching Methods

ABSTRACT

Designed to provide teachers with a set of goals, activities, and supporting resource materials that will assist them in providing students with opportunities to acquire computer skills, knowledge, and understanding, this document presents major concepts and related assignments for a proposed computer curriculum. Topics covered include: the historical development of computers; the computer's impact on the future of society; the vocabulary of terms related to the computer and computer use; correct computer task applications; and computer programming. A variety of hands-on applications and concept instruction is provided throughout; in addition, a pre/post test is included. A significant portion of the document consists of an appendix which includes diagrams, sample keyboards, a list of computer terms, computer operation instructions, educational games, sample programs, eight programming lessons to be completed by students (answers provided), a list of references, and an answer key for the pre/post test. The Meet the Computer Kit referred to is recommended for use by others; however, it is not included. (JB)

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MSAD #5

COMPUTER EDUCATION CURRICULUM

Student Goals and Activities

Grade 6

April 1984

IR011902

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INTRODUCTION

It is the purpose of this document to provide teachers with a set of goals and activities and supporting resource materials that will assist them in providing students with opportunities to acquire computer skills, knowledge and understanding. Major concepts presented in this computer curriculum include; history, social impact, terminology and functions, application, and programming. A variety of hands-on applications and concept instruction is provided throughout. In addition, a pre/post-test is included. Many of the activities which support each concept have been adapted from published sources and accompany the curriculum package for use by MSAD #5 only. The Meet the Computer Kit referred to is recommended for use by others, however, it is not included. Teachers are encouraged to adapt the suggested activities and to incorporate any additional materials or resources which may enhance this computer education curriculum.

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CONTENTS

HISTORY 1-4

SOCIAL IMPACT 5-9

TERMINOLOGY AND FUNCTIONS 10-15

APPLICATION 16-19

PROGRAMMING 20-23

APPENDIX A - Worksheets

1. Wordsearch (student copy) 25
2. Wordsearch (Teacher copy) 26

APPENDIX B -

1. Common Computer Terms 27
2. Crossword Grid 28

APPENDIX C - Worksheets

1. Parts of a Computer (Student copy) 29
2. Parts of a Computer (Teacher copy) 30

APPENDIX D - The 5 Major Components of a Computer 31

APPENDIX E - Keyboard (Filled in) 32

APPENDIX F - Keyboard (Special Function keys Blank) 33

APPENDIX G - Resources and Recommended Programs 34

APPENDIX H - Meet the Computer - TRS 80 (Activity cards)

APPENDIX I - Worksheets - Programming
1. Using the PRINT Statement
2. Using Arithmetic Operations
3. Review
4. Using INPUT Statement
5. Answer Key for Teachers

APPENDIX J - References 35

APPENDIX K - Sources of Programs on CAPS 6 Disk 36

APPENDIX L - Floppy disk Handling and Storage 37

APPENDIX M - Pre/Post Test 38-39
Pre/Post Test Answer Key 40-41

HISTORY

HISTORY

GOAL:

THE STUDENT IS ACQUAINTED WITH MAJOR INDIVIDUALS AND THEIR CONTRIBUTIONS TO THE HISTORICAL DEVELOPMENT OF COMPUTERS.

TEACHER NOTE: Recommended resource is Visual Masters In Teaching About Computers. (See Appendix J).

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Make a time line, to scale, of the technological changes of computers. Be certain to show the 4 generations of computers. (Additional world history and personal history dates can be added).

2. Determine technological advances in other areas that have affected the development of computers. Example: Space program creates the need for the micro-chip.

3. Pretend you are a newspaper reporter covering an important event in computer history. Write a newspaper article about this event telling the important facts: Who? What? Where? When? and How?

4. Make a chart comparing the 4 generations of computers (including size, cost, speed, type of technology). Based upon these past 4 generations, predict a 5th generation of computers. *See Random House, Spotlight on Computer Literacy p. 49.

5. Prepare a display of a vacuum tube, a transistor, an integrated circuit, a micro-chip, etc. for your classmates to observe.

6. Assume you are a citizen of the year 2100. Write a history of computers going back in time to 1984.

HISTORY

GOAL:

THE STUDENT IS ACQUAINTED WITH MAJOR INDIVIDUALS AND THEIR CONTRIBUTIONS TO THE HISTORICAL DEVELOPMENT OF COMPUTERS.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Make a time line, to scale, of the milestones in computer history, (additional world history dates should be included).

2. Indicate on appropriate maps the location of important historic computer events.

3. Work with a partner to prepare a skit telling about a major event in computer history.

4. Make a list of events and/or people involved in computer history.

5. Prepare a bulletin board "Computer Hall of Fame" with pictures or drawings about famous people and events in computer history.

6. Read about one computer inventor or programmer and write a short summary about what the person did. Check reference books such as the encyclopedia. Possible choices are: Blaise Pascal, Charles Babbage, Lady Lovelace, Dr. Herman Hollerith, Howard Aiken, J.P. Eckert, John Mauchley, Dr. John Von Neumann.

HISTORY

GOAL:

THE STUDENT IS ACQUAINTED WITH THE DEVELOPMENT OF NUMBER SYSTEMS.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Produce a class chart of decimal, binary and octal number equivalents.

2. Refer to a computer reference manual to make a code number system using ASCII hexadecimal and send an important message about computers to a classmate.*

3. Have a Math Bee in which teams convert numbers from the binary and/or octal number systems to the decimal number system. *

4. With three of your classmates, show how a binary counter would work by counting from 0 to 8. The four students stand in a line, each with a placard. The placard has a zero and OFF on one side and a one and ON on the other. Each student represents a power of two place value in the binary number system. Initially, all the placards facing the class are at zero. When the teacher claps once, the first place person (at the extreme right facing the class) flips the placard to the one side. On the next clap the first place person flips the card to the zero side and nudges the person to his right who flips his card. Every time a child turns the card so that a ONE is facing him, he will nudge the person next to him as a signal to flip the card. On every clap, the first place person flips his card. (Adopted from Bits 'n Bytes p. 49).

5. Report on the need for, the development of, and the interrelationships of number systems.

* See TRS-80 Model III Operation and Basic Language Reference Manual.

SOCIAL IMPACT

GOALS:

*THE STUDENT IS ABLE TO IDENTIFY COMPUTER USE IN THE COMMUNITY.
*THE STUDENT IS ABLE TO DISCUSS THE IMPACT OF COMPUTERS ON OUR LIVES.
*THE STUDENT IS AWARE OF THE IMPLICATIONS OF THE IMPACT OF COMPUTER TECHNOLOGY ON THE FUTURE OF SOCIETY.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

A. COMPUTERS IN GOVERNMENT:

1. Compile a list of local agencies that use computers.

2. Find out how the local police department uses a computer. Hypothesize the use of computers in the area of law enforcement.

3. Invite a representative from the Internal Revenue Service to speak to your class about the use of computers by that government agency.

4. Organize a panel discussion involving your classmates to present the advantages and disadvantages of computer use by government agencies.

B. COMPUTERS IN OFFICES:

1. Review the classified section of the newspaper to learn of the numbers and types of positions that require computer skills. Write a newspaper want-ad for an office position that requires computer skills.

2. Visit a local office to learn first hand how the computer is used in the office. Report to your class.

3. Take a survey to find out how people in your community view the use of computers in billing practices. Find out about "customized billing".

4. Write an illustrated description of the offices of the future.

5. Create a computer job profile which describes several office jobs, training skills required, job responsibilities, etc.

6. Make a collage with the theme, " Computers in Offices."

C. COMPUTERS IN SUPERMARKETS:

1. Interview the manager of a local supermarket to learn about the store's UPC (Universal Product Code) system.

2. List the ways the UPC helps a supermarket.

3. Design the supermarket of the future.

4. Design a board game to teach your classmates about a "computerized" supermarket.

D. COMPUTERS IN FACTORIES:

1. Write a science fiction story about a computer that is used in a factory.

2. Chart a comparison of factory jobs accomplished by humans, with those done by computers.

3. Design a computerized factory worker.

4. Visit a local factory to learn how computers are used. Report to your classmates.

5. Take a survey to find out the cost of labor vs. the cost of computers used in factories today.

6. List the problems you think a computer might cause as it continues to be used in business.

E. COMPUTERS IN BANKS:

1. Teach a lesson to your classmates about the functions of ATM (Automatic Teller Machines).

2. Discuss a variety of bank statements with your classmates.

3. Invite a representative of a local bank to speak to your class about the importance of computers in banks.

4. Write an essay explaining some of the valuable results of using the computer in banking.

F. COMPUTERS IN HEALTH CARE:

1. List the ways computers are used in health care.

2. Explain, in essay form, why you believe or do not believe, that computers will replace doctors in the future.

3. How will the continuing development of robotics affect health care?

4. Discuss the use of computers by the physically disables.

G. COMPUTERS IN THE MEDIA:

1. Visit a local newspaper office to learn about the use of the computer in preparing a newspaper. Write your opinion of the effect computers have on the newspaper industry.

2. Explain why you think using word processing is better or worse than using a typewriter.

3. Evaluate the impact of using computer-written "personal" letters.

4. Find out who uses computers during a political campaign and election.

5. Visit the computerized disc jockey at your local broadcasting station.

6. Display and explain examples of computer graphics in advertising.

H. COMPUTERS IN SCHOOLS:

1. List the advantages and disadvantages of receiving all of your school instruction from a computer.

2. Interview a school teacher, administrator, student, and parent to learn how these people feel about computer assisted instruction (CAI).

3. Prepare a proposal of the ways in which computers might be utilized more effectively in the schools.

4. Debate the issue of the trend of colleges and universities requiring students to purchase their own computers.

5. Report on the ways in which computers are presently used in your schools.

I. COMPUTERS IN THE SPACE PROGRAM:

1. Write an essay in which you predict future uses of the computer because of the space program.

2. Invent a new use for the computer in the space program.

3. Prepare a scrapbook of computers in the space program.

4. Draw and explain a computer operated space probe.

J. COMPUTERS IN YOUR HOME:

1. Take a survey to learn how many people have home computers, why they have the, and how they use them.

2. Find out how many typical home appliances that claim to have "built in" computers are truly computerized.

3. Diagram the computerized home of the future.

K. MISCELLANEOUS:

1. Investigate the uses of computers in sports and sporting events.

2. If a computer were small enough and inexpensive enough for you to own and carry, what would you use it for?

3. Can you think of ways in which a computer could do something drastic to change the way people live today? Think about leisure time activities, personal privacy, conveniences, etc.

4. Determine additional ways in which the computer is used in the world around you. Create an illustrated list.

TERMINOLOGY AND FUNCTIONS

TERMINOLOGY AND FUNCTIONS

GOAL:

THE STUDENT KNOWS AND UNDERSTANDS THE VOCABULARY OF TERMS RELATED TO THE COMPUTER AND COMPUTER USE.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Complete the "Word Search" of computer terms. (Appendix A)
2. Design a crossword puzzle using computer terms. (Appendix B).
3. Write a paragraph using as many computer terms as possible.
4. Create your own glossary of computer terms. (This may be in the form of an on going compilation of terms and their meanings).

TERMINOLOGY AND FUNCTIONS

GOAL:

THE STUDENT IS ABLE TO DISTINGUISH BETWEEN COMPUTER HARDWARE AND SOFTWARE.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE BUT, NOT LIMITED TO:

1. Invite a computer expert, user, programmer, or another student who has participated in a computer course, to review the computer hardware with the students.

2. Create a bulletin board display illustrating the wide variety of available computer hardware and software.

3. Complete the "Parts of a Computer" worksheet. (Appendix C)

TERMINOLOGY AND FUNCTIONS

GOAL:

THE STUDENT KNOWS THE 5 MAJOR COMPONENTS OF A COMPUTER.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Create your own diagram of the 5 major components of a computer. (Appendix D)

2. Write the names of the 5 components of the computer and describe the function of each.

3. Design your own computer. Create a model which is unique but which contains the 5 basic components. Describe the functioning of your computer for your classmates.

4. Collect store ads, catalogs, and flyers, or write to companies for catalogs. Using these, create a class computer file with index cards describing various computer components. When cards are completed, divide them into categories for INPUT, OUTPUT, CENTRAL PROCESSING UNIT (CPU), ARITHMETIC LOGIC UNIT (ALU), and MEMORY.

TERMINOLOGY AND FUNCTIONS

GOAL:

THE STUDENT IS MADE AWARE OF THE FUNCTIONS OF COMPUTERS.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. List all of the things you think computers can do and why. Give examples of tasks a computer can do, but which are more advantageous for humans to do. Then list activities which a computer cannot do and why.

2. Work in a team to study a field such as science, education, government, etc.. Determine the difference between "human" tasks and "computer" tasks in that field.

3. Visit a travel agency to learn how DATA is stored in the computer.

TERMINOLOGY AND FUNCTIONS

GOAL:

THE STUDENT IS FAMILIAR WITH THE COMPUTER KEYBOARD.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Salvage or borrow some manual typewriters. Students may not have typing skills which they will need. They can gain typing skills and save valuable time by utilizing the Keyboard Skills Activities in Appendix A (12-12d) of the Maine Computer Curriculum Project, Grade 3 curriculum.

2. Prepare copies of a mock-up of your computer keyboard. This especially helps if typewriters are unavailable. Students should practice at the mimeographed keyboard. (Appendix E)

3. Fill in a mock-up of a computer keyboard. Explain and/or demonstrate the function of the "special keys". (Appendix F)

APPLICATION

APPLICATION

GOAL:

THE STUDENT WILL UNDERSTAND THAT COMPUTERS ARE BEST SUITED TO TASKS THAT REQUIRE SPEED, ACCURACY, AND REPEATED OPERATIONS.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Students construct bulletin boards consisting of collages illustrating computer uses.

2. Students report on computer application in one of the following areas: business, weather forecasting, banking, industry, etc..

3. Students invite guest speakers who use computers in their occupations. Request that speakers bring samples of computer printouts and interpret data for students.*

4. Students prepare reports in which they anticipate future computer usage. In place of reports, consider brainstorming, small group presentations, debates, etc..

5. Students prepare and display a continuing documented list of where and how computers are currently being used.

6. Students visit local businesses, agencies, etc., to learn where computers are currently being used.

7. Students test their speed and accuracy against that of the computer by utilizing a program that gives an alphabetical sort. This should be done in two different ways to demonstrate speed: Trial #1 Both the student and the computer begin at the same moment - The computer is turned on, the program is loaded, the data is entered, and the results are displayed. The student writes the information on cards and alphabetizes the cards. Trial #2 - Data has been entered into the computer and is ready for the sort. (Recommended Programs: DATABASE, ALFALIST, BUBSORT/BAS). *

*Appendix G

page 17 continued

8. To use the computer as a "Super Calculator",: students should experiment with a program such as CALCULATOR. Selected students should develop their own program to do simple calculating functions. *

9. Selected students should develop their own program for finding averages, or use a program such as MARGRADE to count their grades. *

*Appendix G

APPLICATION

GOAL:

THE STUDENT IS ABLE TO DETERMINE WHETHER OR NOT A PROBLEM IS SUITED TO COMPUTER SOLUTION.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. To demonstrate that mental computations can be as fast or faster than the computer, allow two students to compute the same simple math problem. Beginning at the same moment, one student should solve the problem and provide the answer orally as the second student solves the problem and enters the answer into the computer for display on the screen. For this demonstration use the program, THREE MINUTE JOBBIE. (Appendix G)

2. To illustrate that in order for a computer to solve a problem the problem must first be translated and written in computer terms, use a non-mathematical program, such as BOUNCING BARNEY. In this exercise, students should identify the many different symbols and expressions used by the computer. (Must LIST the program on hard-copy) - (Appendix G)

3. Teachers may review computer printouts of student test results for the purpose of demonstrating human interpretation of computer data.

4. Students should contribute computer printouts from several non-school fields and interpret the data for their classmates.

5. Students compile a list of tasks that would not be suited to computer solution.

APPLICATION

GOAL:

THE STUDENT IS ABLE TO USE "CANNED" PROGRAMS IN A MICROCOMPUTER.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Students may use ALPHAKEY for the purpose of becoming familiar with the computer keyboard prior to utilizing canned programs.

2. Students should be encouraged to practice various skill areas such as: *

   Math: THREE MINUTE JOBBIES, GALAXY
   L.A.: FUNDAMENTAL PUNCTUATION PRACTICE
   Spelling: HANGMAN
   Science: NEWTON'S LAW
   S.S.: CONTINENTS AND OCEANS

3. Students should be encouraged to practice decision making based on variables by using programs such as: HOT DOG STAND, TRAVEL AGENT, AND SURVEYOR. *

4. Students should be encouraged to practice logical thinking and rapid recall through simulations such as: MEMORY BUILDER, LOST DUTCHMAN'S GOLD, AND ESCAPE. *

5. Students should be encouraged to practice deductive thinking through edu-games such as: TEASERS BY TOBBS. *

* Appendix G

PROGRAMMING

PROGRAMMING

GOAL:

THE STUDENT KNOWS THAT THE COMPUTER CAN USE A VARIETY OF LANGUAGES AND IS ABLE TO IDENTIFY THE PURPOSE FOR WHICH EACH IS USED.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Invite representatives of various occupations in which computer languages such as COBOL, FORTRAN, etc., are used, to participate in a panel discussion of why these languages are used in a particular line of work.

2. Create a list of occupations in which the various computer languages are applied.

PROGRAMMING

GOAL:

THE STUDENT IS ABLE TO CREATE A PROGRAM USING BASIC.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. Refer to "Meet the Computer TRS-80", a kit by Sunburst Publications. This kit provides instruction in computer programming in the BASIC computer language. Students should progress through the following instruction folders in this kit: (Appendix H)

Recommended Units	1. Getting Started 2. What Is A Program? 3. What If You Get An Error? 4. PRINT (Immediate Mode-Without Line Numbers) 5. PRINT (Program Mode-With Line Numbers) 6. GOTO
If You Want To Go Further	7. LET 8. INPUT
	9. Quick Reference Card

PROGRAMMING

GOAL:

THE STUDENT IS ABLE TO USE THE COMPUTER AS A PROBLEM SOLVING TOOL.

TEACHER NOTE: IMPORTANT - REVIEW "FLOPPY DISK HANDLING AND STORAGE" (APPENDIX L) BEFORE USING THE COMPUTER IN ANY ACTIVITIES.

SUGGESTED STUDENT ACTIVITIES SHOULD INCLUDE, BUT NOT BE LIMITED TO:

1. A series of exercises are provided in Appendix I - to strengthen problem solving skills: These exercises have been adapted from "Practicing Programming on the TRS-80" by Random House Publishing Company. (Appendix I)

APPENDIX

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3/85

DIRECTIONS: Locate common computer terms within the grid of letters. The words are located on the vertical, horizontal, and diagonal axes. The words are in forward and reverse order of spelling.

BASIC
BREAK
CASSETTERECORDER
CLS
COMMAND
CURSOR
DISKDRIVE
ENTER
GOTO
INPUT
LET
MICROCOMPUTER
NEW
PASCAL
PRINT
PROGRAM
RAM
ROM
SHIFT
SOFTWARE
STRING

BINARY
BYTE
CASSETTETAPE
COBOL
CPU
DATA
DISKETTE
FORTRAN
HARDWARE
KEYBOARD
LIST
MONITOR
OUTPUT
PERIPHERALS
PRINTER
PROGRAMMER
ROBOTICS
RUN
SILICONCHIP
SPACEBAR
SYNTAXERROR

Z	I	Y	W	S	M	H	A	R	D	W	A	R	E	L	B	R	C	S	D
L	R	T	R	Y	V	S	D	I	S	K	D	R	I	V	E	X	A	H	I
K	N	E	A	N	D	B	B	P	O	R	F	W	N	T	S	T	S	I	S
S	F	H	Q	T	W	T	I	R	G	U	E	A	U	D	T	B	S	F	K
B	R	S	V	A	G	A	N	I	O	N	R	P	B	P	R	E	E	T	E
M	T	P	E	X	K	N	A	N	Q	T	M	C	A	R	I	W	T	Y	T
K	R	E	G	E	U	S	R	T	R	O	F	A	S	O	N	M	T	T	T
Q	K	R	Z	R	N	R	Y	O	C	O	P	S	I	G	G	I	E	F	E
I	L	I	P	R	B	J	F	O	K	U	V	S	C	R	C	N	R	S	D
L	S	P	I	O	I	D	R	S	E	T	M	E	S	A	P	S	E	P	A
O	U	H	I	R	A	C	P	O	Y	P	M	T	I	M	U	M	C	A	T
W	H	E	C	B	I	Q	A	F	B	U	L	T	L	M	R	H	O	C	A
B	A	R	I	M	G	C	S	T	O	T	B	E	I	E	O	L	R	E	I
M	I	A	P	I	O	U	C	W	A	C	R	T	C	R	B	I	D	B	C
O	H	L	R	N	T	R	A	A	R	O	E	A	O	B	O	S	E	A	P
N	V	S	K	P	O	S	L	R	D	B	A	P	N	Y	T	T	R	R	C
I	Z	J	T	U	Q	O	B	E	M	O	K	E	C	T	I	R	C	E	M
T	C	E	N	T	E	R	E	G	Z	L	V	C	H	E	C	H	O	A	G
O	W	C	C	O	M	M	A	N	D	K	F	L	I	E	S	D	R	M	Z
R	E	O	Q	P	R	O	G	R	A	M	M	S	P	R	I	N	T	E	R

1ST NUMBER IS THE ROW NUMBER
2ND NUMBER IS THE COLUMN NUMBER
3RD NUMBER IS THE DIRECTION NUMBER
1 = DOWN 2 = RIGHT 3 = R-UP 4 = R-DOWN
5 = UP 6 = LEFT 7 = L-DOWN 8 = L-UP

Answer Key

5	14	1	BASIC	3	8	1	BINARY
13	12	1	BREAK	15	15	1	BYTE
1	18	1	CASSETTERECORDER	6	13	1	CASSETTETAPE
18	13	1	CLS	14	11	1	COBOL
19	4	2	COMMAND	9	16	1	CPU
13	7	1	CURSOR	9	20	1	DATA
2	8	2	DISKDRIVE	1	20	1	DISKETTE
18	3	2	ENTER	9	8	3	FORTRAN
13	6	1	GOTO	1	7	2	HARDWARE
14	5	1	INPUT	9	10	1	KEYBOARD
1	15	4	LET	13	17	1	LIST
13	5	3	MICROCOMPUTER	14	1	1	MONITOR
5	11	3	NEW	8	11	1	OUTPUT
11	8	1	PASCAL	6	3	1	PERIPHERALS
3	9	1	PRINT	20	14	2	PRINTER
20	5	2	PROGRAM	5	15	1	PROGRAMMER
19	18	3	RAM	12	16	1	ROBOTICS
17	17	4	ROM	3	11	1	RUN
1	19	1	SHIFT	10	14	1	SILICONCHIP
10	9	1	SOFTWARE	9	19	1	SPACEBAR
3	16	1	STRING	1	5	1	SYNTAXERROR

Z	I	Y	W	S	M	H	A	R	D	W	A	R	E	L	B	R	C	S	D	1
L	R	T	R	Y	V	S	D	I	S	K	D	R	I	V	E	X	A	H	I	2
K	N	E	A	N	D	B	B	P	O	R	F	W	N	T	S	T	S	I	S	3
S	F	H	Q	T	W	T	I	R	G	U	E	A	U	D	T	B	S	F	K	4
B	R	S	V	A	G	A	N	I	O	N	R	P	B	P	R	E	E	T	E	5
M	T	P	E	X	K	N	A	N	Q	T	M	C	A	R	I	W	T	Y	T	6
K	R	E	G	E	U	S	R	T	R	O	F	A	S	O	N	M	T	T	T	7
Q	K	R	Z	R	N	R	Y	O	C	O	P	S	I	G	G	I	E	F	E	8
I	L	I	P	R	B	J	F	O	K	U	V	S	C	R	C	N	R	S	D	9
L	S	P	I	O	I	D	R	S	E	T	M	E	S	A	P	S	E	P	A	10
O	U	H	I	R	A	C	P	O	Y	P	M	T	I	M	U	M	C	A	T	11
W	H	E	C	B	I	Q	A	F	B	U	L	T	L	M	R	H	O	C	A	12
B	A	R	I	M	G	C	S	T	O	T	B	E	I	E	O	L	R	E	I	13
M	I	A	P	I	O	U	C	W	A	C	R	T	C	R	B	I	D	B	C	14
O	H	L	R	N	T	R	A	A	R	O	E	A	O	B	O	S	E	A	P	15
N	V	S	K	P	O	S	L	R	D	B	A	P	N	Y	T	T	R	R	C	16
I	Z	J	T	U	Q	O	B	E	M	O	K	E	C	T	I	R	C	E	M	17
T	C	E	N	T	E	R	E	G	Z	L	V	C	H	E	C	H	O	A	G	18
O	W	C	C	O	M	M	A	N	D	K	F	L	I	E	S	D	R	M	Z	19
R	E	O	Q	P	R	O	G	R	A	M	M	S	P	R	I	N	T	E	R	20
	2		4		6		8		10		12		14		16		18		20	

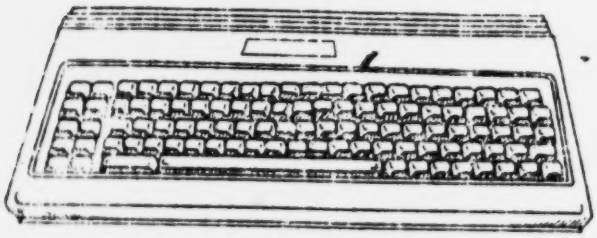
COMMON COMPUTER TERMS

SHIFT	Hardware
BREAK	Printer
ENTER	Keyboard
PRINT	Disk Drive
LET	Cassette Tape
INPUT	Cassette Recorder
RUN	Monitor
NEW	Peripherals
LIST	Artificial Intelligence
CLS	Robotics
GOTO	Software
Spacebar	Disk, Floppy Disk, Diskette
Input	Programmer
CPU	Program
RAM	BASIC
ROM	LOGO
Output	COBOL
Microcomputer	PASCAL
Binary	FORTRAN
Silicon Chip	Command
Byte	Cursor
Bit	DATA
String	Syntax Error

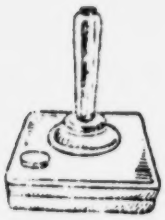
- for making a crossword puzzle

PARTS of a COMPUTER

Input Devices

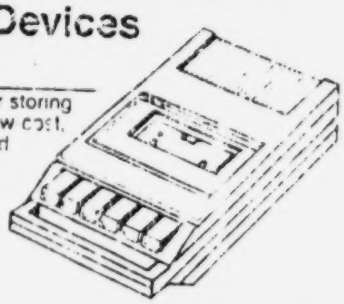


A row of keys on which you type in data or commands. It's wired to the computer chip.

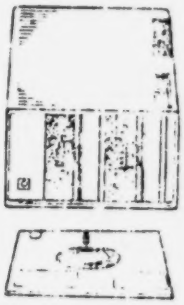


A device that controls games on monitor or TV set.

Storage Devices



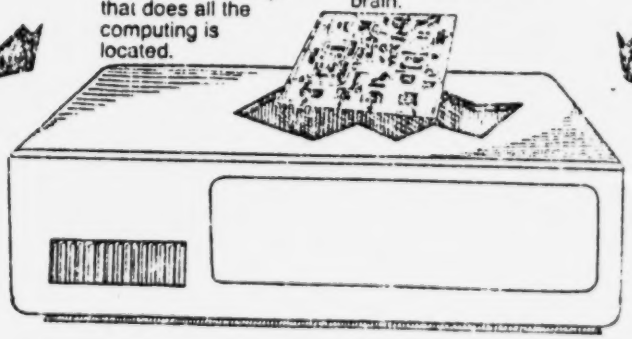
A device for storing data. It's low cost, but slow and chancy



Another data-storing device. It is costly, but fast and reliable.

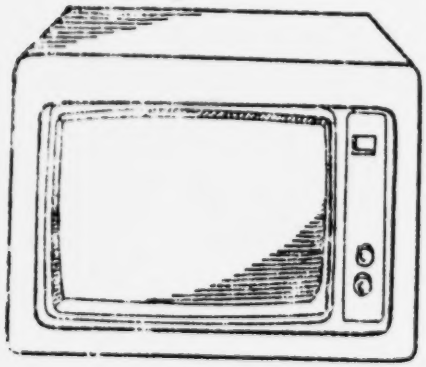
A wafer of silicon containing the tiny transistors and circuits that make up the entire computer brain.

Box where the chip that does all the computing is located.

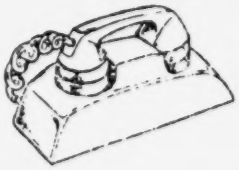


Output Devices

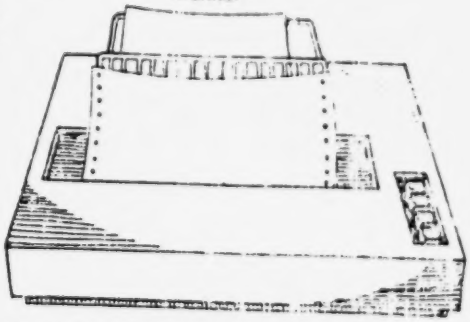
The device on which commands from the chip show up.



(short for modulator-demodulator) Equipment that links two computers over a telephone line.



A machine that prints out a paper copy of the computer's work that has appeared on the monitor



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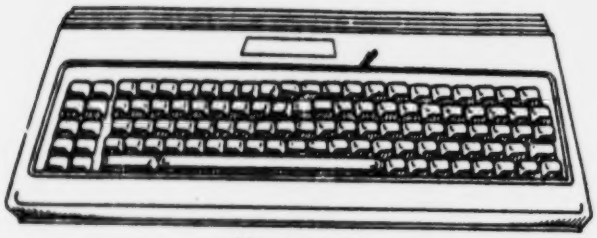
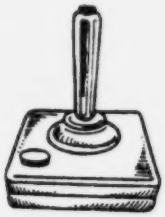
EYE ON COMPUTER SCIENCE

PARTS of a COMPUTER

Input Devices



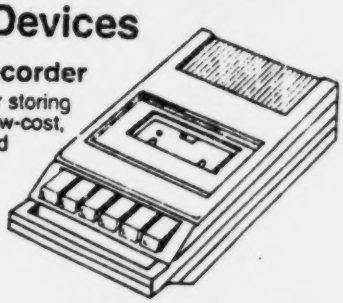
Keyboard
A row of keys on which you type in data or commands. It's wired to the computer chip.



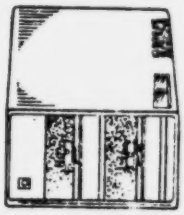
Joystick
A device that controls games on monitor or TV set.

Storage Devices

Tape Recorder
A device for storing data. It is low-cost, but slow and chancy.



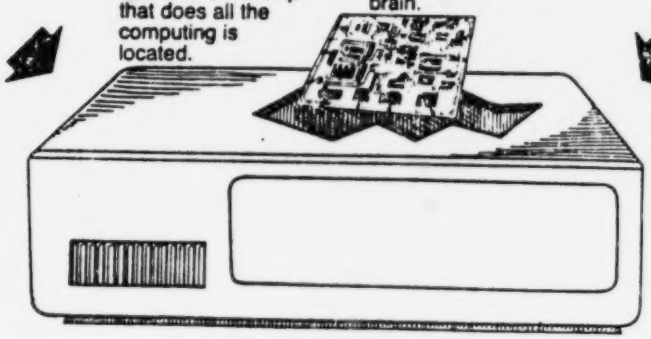
Disk Drive
Another data-storing device. It is costly, but fast and reliable.



Disk

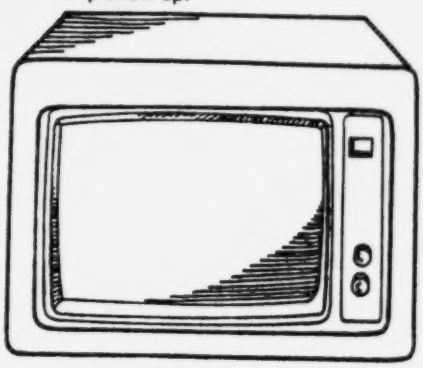
Chip
A wafer of silicon containing the tiny transistors and circuits that make up the entire computer brain.

Central Processing Unit
Box where the chip that does all the computing is located.

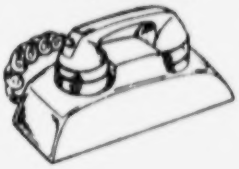


Output Devices

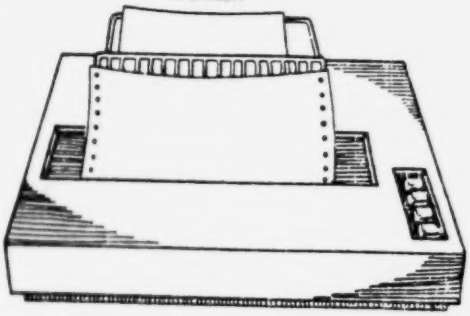
Monitor or TV Set
The device on which commands from the chip show up.



Modem
(short for modulator-demodulator) Equipment that links two computers over a telephone line.



Printer
A machine that prints out a paper copy of the computer's work that has appeared on the monitor.



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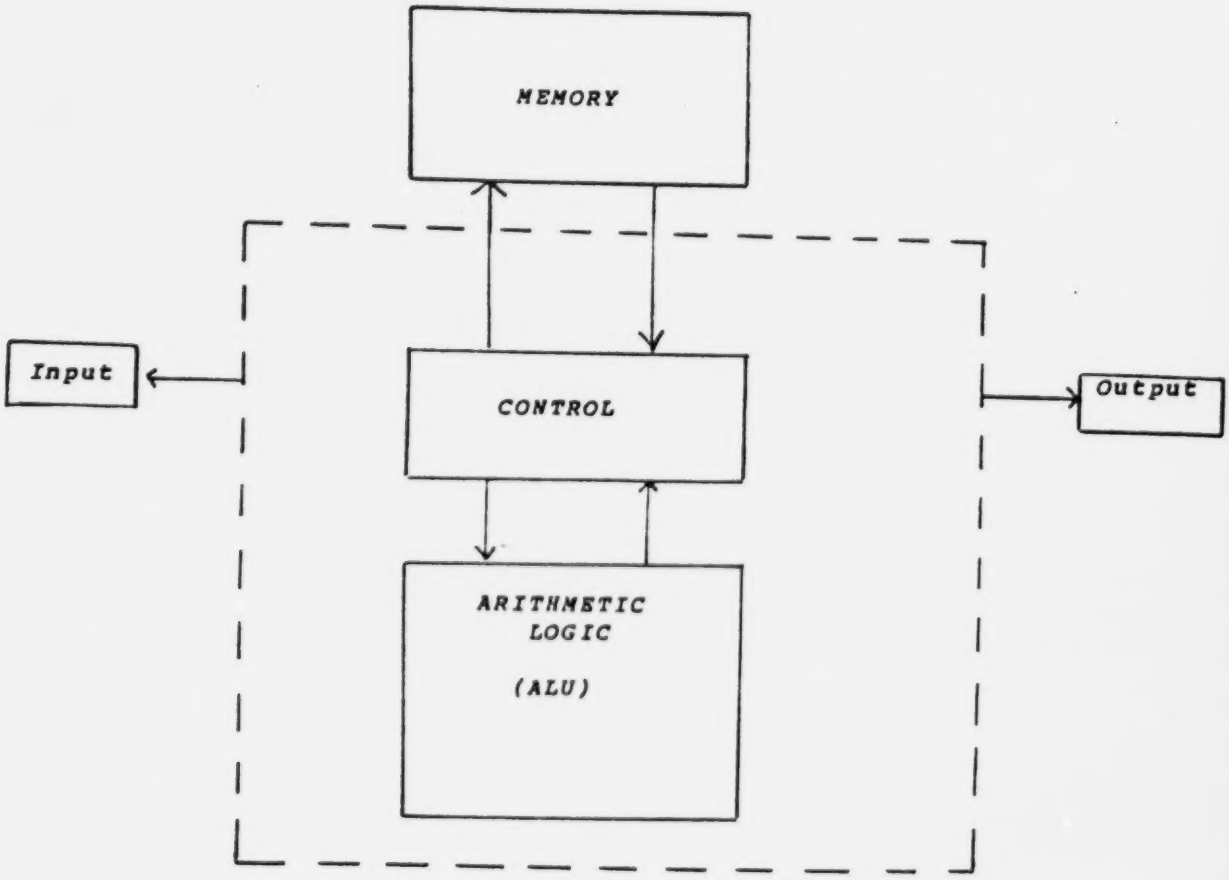
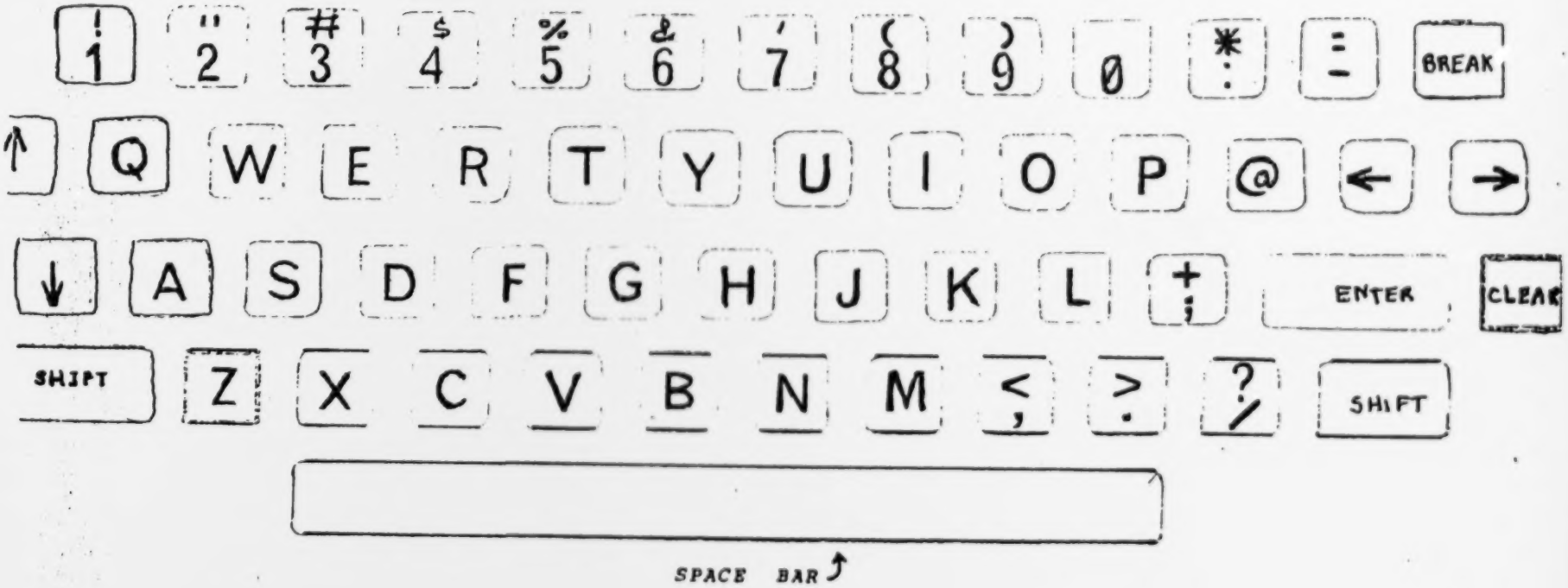
THE 5 MAJOR COMPONENTS OF A COMPUTER

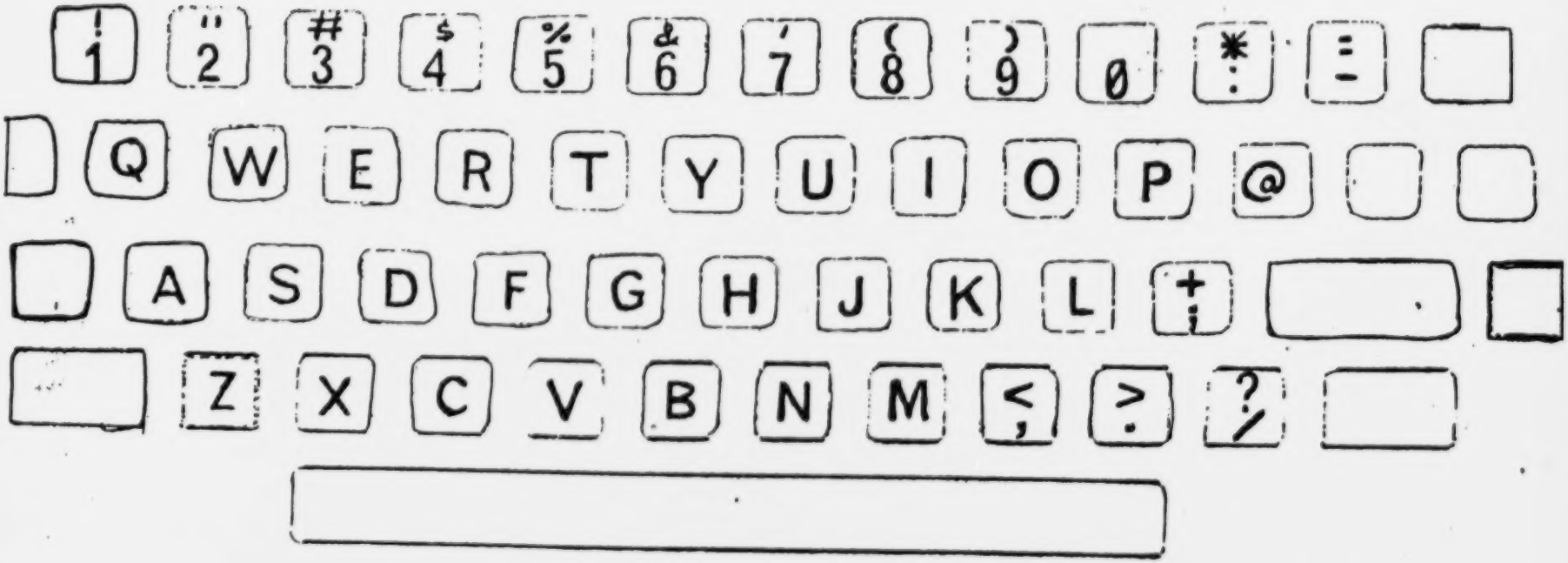


CPU

TRS-80 KEYBOARD



TRS-80 KEYBOARD



RESOURCES

I. FIELD TRIPS/GUEST SPEAKERS

1. Hospital or Medical Center
2. Local Credit Bureau
3. Local Banks
4. Insurance Companies
5. Retail Stores - Super Market
6. Local Newspaper
7. Social Security Office
8. Police Department
9. Department of Motor Vehicles
10. Power Company
11. Travel Agency
12. Automobile Dealerships
13. School Department Central Office
14. School Department Guidance Office

II. RECOMMENDED PROGRAMS:

CAPS 6- (Computer Application Program Series)

All Programs Could Be Made Available On One Disk

ALFALIST
ALPHAKEY
BOUNCING BARNEY
BUBSORT/BAS
CALCULATOR
CONTINENTS AND OCEANS
DATABASE
EXCAPE
FUNDAMENTAL PUNCTUATION PRACTICE
GALAXY
HANGMAN
HOT DOG STAND
LOST DUTCHMAN'S GOLD
MARGRADE
MEMORY BUILDER
NEWTON'S LAW
SURVEYOR
TEASERS BY TOBBS
THREE MINUTE JOBBIE
TRAVEL AGENT

1

GETTING STARTED (MODELS III AND IV)
DISK DRIVE
(with diskette)

MODEL III and IV are operated the same way, therefore the directions given for one, apply to both.

***** IMPORTANT *****

BE SURE THE DISK SYSTEM DOES NOT HAVE A DISKETTE IN EITHER THE TOP OR BOTTOM DRIVE UNIT.

1. Turn the unit on by flipping the rocker switch located under the right-hand corner.

GET INSTRUCTION ON HOW TO HANDLE THE DISKETTES CORRECTLY. MISHANDLING THE DISKETTE CAN DAMAGE THEM PERMANENTLY.

2. Get a diskette that contains the operating information (not a new unused one).

3. Fully insert the diskette in the lower drive unit (zero) and close the drive door.

4. Push the (ORANGE RESET BUTTON).

5. You will be asked for the date in the form of 03/26/84, which you should type and (ENTER).

6. You will also be asked for the time, but this is optional. Either type the time or just push (ENTER).

7. The next message, TRSDOS READY, indicates you have properly loaded the computer.

8. To get the computer ready for programming, type the word BASIC and push (ENTER).

9. Push (ENTER) when you see the question:
   How Many Files ?

10. Also push (ENTER) for the following:
    Memory Size?

11. Now you are ready to begin.

12. The small, white, flashing block that appears on your screen after the) sign is called the cursor. The cursor tells you where anything you type will be printed on the screen.

***** IMPORTANT *****

BEFORE YOU TURN THE COMPUTER OFF, REMOVE THE DISK, OTHERWISE YOU COULD ERASE OR ALTER PROGRAMS ON THAT DISK.

GETTING STARTED (MODELS III AND IV)
DISK-DRIVE
(without diskette)

MODEL III and IV are operated the same way, therefore the directions given for one, apply to both.

1. Be sure the disk system does not have a diskette in either the top or bottom unit.

2. Turn the unit on by flipping the rocker switch located under the right-hand corner. The red light on the drive unit will come on and the motor will turn. Nothing will appear on the screen, yet.

3. Hold down the (BREAK) key while you push the (ORANGE RESET BUTTON). The following message should appear:

   Cass?

4. Press the (ENTER) key, and another message should appear:

   Memory Size?

5. Press (ENTER) once again.

   Radio Shack Model III Basic
   (c)' 80 Tandy
   READY

6. Now you are ready to begin.

7. The small, white flashing block that appears on your screen after the) sign is called a cursor. The cursor tells you where anything you type will be printed on the screen.

GETTING STARTED (MODELS III AND IV)
NO DISK DRIVE

MODEL III and IV are operated the same way, therefore the directions given for one, apply to both.

1. Turn the unit on by flipping the rocker switch located under the right-hand corner.

2. The following message should appear:

   Cass?

3. Press the (ENTER) key, and another message should appear:

   Memory Size?

4. Press (ENTER) once again.

   Radio Shack Model III Basic
   (c)' 80 Tandy
   READY

5. Now you are ready to begin.

6. The small, white flashing block that appears on your screen after the) sign is called a cursor. The cursor tells you where anything you type will be printed on the screen.

WHAT DOES THE COMPUTER KNOW?

When the TRS-80 is turned on, the BASIC language is in the computer's memory. This allows the computer to "understand" statements and commands that are part of BASIC. For example, the computer is able to solve math problems and print information on the screen.

PROBLEMS SECTION

If the computer did not come on as described, one or more of the following situations could exist.

1. Your computer has a disk drive unit.
   If you are not sure, check with the teacher or read the owner's manual.
   Solution: As you will not be using the disk drive, hold down the BREAK key when you turn the computer on.

2. The computer is not plugged in.
   Solution: Ask your teacher to plug it in.

3. The computer is not properly set up (This would be with a Model I).
   Solution: Check with your teacher or read the owner's manual.

4. The brightness or contrast controls are out of adjustment.
   Solution: Adjust the controls with the computer turned on. Ask your teacher or read the owner's manual for the location of the knobs.

HOW TO TREAT THE COMPUTER

1. Do not turn the power off and on any more than you need to. If you turn the power off, wait a minute before you turn it back on.

2. Keep the computer clean (no dust, gum, liquid or jelly fingers).

3. Be gentle with the keyboard. It is one of the most expensive parts of the computer.

HOW TO TURN THE COMPUTER OFF

To turn the computer off, just press all the buttons that you pushed to turn it on. On the Model I, there are two buttons, one at the back of the keyboard and one, marked "Power", to the right of the screen. On the Model III, there is just one button, under the keyboard on the right hand side.

KNOW YOUR WAY AROUND THE COMPUTER

Take a good look at the computer keyboard. Although it is similar to that of a typewriter, there are a few special keys for computer use.

NUMBER KEYS

Some computers have two sets of number keys on the keyboard, one on the right hand side and one over the letters. You can use either set to type numbers.

The SHIFT Key

Several keys have two characters on them. For example, the keys on the top row have both numbers and other characters on them. If you press any of these keys, the computer will print out the bottom character. To set the computer to print out the top character, hold down the SHIFT key while you press the key with the character. Do this for a few of the keys.

Special Keys

You should also know the following special keys:

CLEAR - This key will clear the screen. Try it.

ENTER - The ENTER key tells the computer that you have finished typing a line and that it should accept the information.

← *This key, called the backspace key, will move the cursor one space to the left and erase the character that you have just typed. For example, if you type HELLP instead of HELLO, press this key and the P will be erased. You can use this to correct typing mistakes before you press ENTER. Try it.*

↓ *This key will move the cursor down one line, Try it.*

* *This symbol is on the same key as the colon. It stands for multiplication. 5*2 means 5 times 2.*

\- *This symbol is on the same key as the =. It stands for subtraction or a negative number. 6-3 means 6 minus 3. -5 means negative 5.*

/ *This symbol is on the same key as the question mark and it stands for division. 6/2 means 6 divided by 2.*

\+ *This symbol is on the same key as the semicolon and it stands for addition. 8+2 means 8 plus 2.*

BREAK The key marked BREAK will stop the computer in the m middle of a program.

Ø This is the symbol for the number zero, Ø. Do not use the letter O for this number, as the computer will not accept it as a zero.

Now you are ready to begin having some fun on the computer.

COMMANDS:

Command	Use
DELETE 30	to erase line 30 from the program
DELETE 5—10	to erase all lines from 5 to 10, including lines 5 and 10
LIST	to print the entire program on the screen
LIST 20	to LIST line 20
LIST 5—10	to LIST lines 5 to 10, including lines 5 and 10
LIST 75 –	to LIST all lines from line 75 on
LIST – 50	to LIST all lines up to and including line 50
NEW	to erase the program from the computer's memory. Use this command with caution
RUN	to tell the computer to follow the program instructions from the beginning
RUN 50	to RUN the program, starting at line 50

KEYBOARD:

Key	Use	Example
BREAK	to stop the running of a program	
CLEAR	to clear the screen	
ENTER	to tell the computer to process the line that you just typed	
SHIFT	to type the upper characters on the keys	SHIFT , gives ' SHIFT ; gives +
←	to erase the last character you typed in	
↓	to move the cursor down one line	

Key	Use	Example
+	stands for addition	10 PRINT 7 + 9
–	stands for subtraction	10 PRINT 10 – 6
*	stands for multiplication	10 PRINT 12 * 5
/	stands for division	10 PRINT 50 / 4
0	stands for the number zero (do not use the letter O)	10 PRINT 40 + 10
"	to enclose strings	10 PRINT "HELLO"
:	to separate two or more statements that are on one program line	15 PRINT "HI":INPUT A$ 20 FOR X = 1 TO 9:NEXT
=	in comparisons, it stands for equal to	10 IF A = B THEN 60 20 IF D$ = E$ THEN 80
<	in comparisons, it stands for less than	10 IF X < Y THEN 20 20 IF A$ < M$ THEN 30
>	in comparisons, it stands for greater than	10 IF A > B THEN 100 20 IF C$ > D$ THEN 120
< >	in comparisons, it stands for not equal to	15 IF X < > Y THEN 200 20 IF X$ < > Y$ THEN 50
< =	in comparisons, it stands for less than or equal to	30 IF P < = Q THEN 20 40 IF S$ < = T$ THEN 80
> =	in comparisons, it stands for greater than or equal to	55 IF R > = Q THEN 80 50 IF P$ > = N$ THEN 60
$	to tell the computer that a variable is a string variable	40 LET A$ = "CAT"

Type another number and press **ENTER.** Now what happened?
The computer should have added the two numbers you just typed and printed the answer to the problem.
What is the value of A? What is the value of B?

Now type

```
PRINT A
PRINT B
```

Were you right?
Did you remember to press ENTER after each line?
Run the program and this time when the computer prints a ? type a letter instead of a number. What happened?
A ?REDO message appeared on the screen. The computer did not accept the letter because a letter is a string and the variable in the INPUT statement is numeric and will only accept a number as a value. Remember that if a string variable follows the keyword INPUT any key, including numbers, will be accepted and become a string.
Now press the **BREAK** key to stop the running of the program.

Type **NEW** and press **ENTER.**

Program 2

Type

```
10 PRINT "TYPE A NUMBER": INPUT D
20 PRINT "TYPE ANOTHER NUMBER": INPUT E
30 PRINT D;" + ";E;" = ";D + E
```

Notice that in lines 10 and 20 we have two statements on a line: INPUT and PRINT. You can put two or more statements on a line if you separate them with colons. The PRINT statements in lines 10 and 20 above tell the person who is using the program what information to type.

Type **RUN** and press **ENTER.**

Add the following line:

```
40 GOTO 10
```

Type **RUN** and press **ENTER.** How did line 40 change the program?

Press the **BREAK** key to stop the program.

Change lines 10 and 20 by typing a semicolon before the colon.

Type **RUN** and press **ENTER.** What happened?
Note that the computer printed the question mark at the end of the statement you made it print, instead of on the next line.

Type **NEW** and press **ENTER.**

Program 3

Type

```
10 INPUT "TYPE YOUR NAME ";N$
20 PRINT "HELLO";N$;" NICE TO MEET YOU"
```

Note that in line 10 we use the INPUT statement to print a message on the screen before the ? appears.

Type **RUN** and press **ENTER.**
Change line 20 by adding a space between the O in HELLO and the quotation marks.
Hint: Why did the computer print a space between your name and NICE?
Note that to put spaces in a sentence, the spaces must be within quotation marks.

Type **NEW** and press **ENTER.**

Test your programming skills:

1. Write a program that will first add, then subtract, then multiply two numbers that are input by the user of the program. Be sure to print the problems and the answers.

2. Write a program to find the perimeter of a rectangle. The user of the program will input the length and width of the rectangle. Hint: Perimeter = 2 times the length + 2 times the width.

3. Write a program to write thank you letters. The program should ask for your name, the name of the person who gave

The LET statement can be used in the immediate mode (without line numbers) or in the program mode. We will begin using LET in the immediate mode.

Example 1
Type
```
LET A = 80
LET B$ = "TRS-"
```
Press ENTER after each line.

The computer has now labelled two boxes in memory. Box A is filled with 80 and box B$ is filled with TRS-.

A	B$
80	TRS-

To find the value of a variable, you must use the PRINT statement.

Example 2
Type
```
PRINT A
PRINT B$
```
Press ENTER after each line.

The number 80 and the letters TRS- should have appeared on the screen on two separate lines. Note that when we type PRINT A, the computer prints the value of the variable A. How can we print the letter A on the screen? Try it.

Example 3
Type
```
PRINT B$;A
PRINT A;B$
```

Note that if you want to print two variables next to each other on one line, you must separate them with a semicolon.

Example 4
Type
```
LET B = 4
LET C = A/B
PRINT C
PRINT C + B
```

The numbers 20 and 24 should have appeared on the screen. Note that the computer remembers the value that we assign to a variable so that it can use the value later.

Now we will learn to use the LET statement in the program mode. When you use the LET statement in the program mode, the value of a variable is set during the program.

Type **NEW** and press **ENTER**.

Program 1
Type
```
10 LET A$ = HELLO
```

Now type **RUN** and press **ENTER**. What happened?
A ?TM Error message appeared. This message means type mismatch. A$ is a string variable, so HELLO must be typed between quotation marks. You will get the same error message if you use the LET statement to assign a string value ("JOHN") to a numeric variable (X).

Now type the following. Remember to press **ENTER** after each line.

```
10 LET A$ = "HELLO"
20 LET B$ = "PETER"
30 PRINT A$
40 PRINT B$
```

Type **RUN** and press **ENTER**. What happened?
Change the program to print HELLO and PETER on one line. Hint: You must add a semicolon to one of the PRINT statements.
Type **NEW** and press **ENTER**.

Program 2
Type
```
10 D$ = "  *  "
20 E$ = " *** "
30 F$ = "*****"
40 PRINT D$
50 PRINT E$
60 PRINT F$
```

Program 2

Type

```
10 PRINT "SOME THING[illegible] [illegible]N FOREVER"
20 GOTO 10
30 PRINT "FIND ME IF YO[illegible] [illegible]
```

Type **RUN** and press **ENTER.** Press the **BREAK** key to stop the program.

What happened?

Why wasn't line 30 printed?

Type **NEW** and press **ENTER.**

Program 3

Type

```
10 PRINT "WHAT YOU S[illegible]
20 GOTO 40
30 PRINT "WHAT YOU G[illegible]
40 PRINT "NOT WHA[illegible]
```

Type **RUN** and press **ENTER.**

Why didn't the computer print line 30?

Why didn't the computer create an endless loop as in Program 1?

Hint: To which line does the GOTO statement refer?

Type **NEW** and press **ENTER.**

Program 4

Type

```
10      A = 1
20 PRINT A
30      A = A + 1
40 GOTO 20
```

Type **RUN** and press **ENTER.**

Press the **BREAK** key to stop counting.

Note that in line 30 we made the variable A equal to itself plus another number. This is a very useful tool to use on the computer. It is called a counter.

Change this program to count by 2's.

Hint: You must change something in line 30.

Run the program to see if you made the correct change.

Stop the program.

Change line 20 by adding a comma at the end.

Type **RUN** and press **ENTER.** Stop the program. What happened?

Type **NEW** and press **ENTER.**

Test your programming skills:

1. Print your name on the screen in one column.

2. Fill the screen with your name.

3. Print your name in four columns on the screen.

4. Write a program to count by 5's and fill the screen with numbers.

5. Write a program to count by 9's and print the numbers in four columns.

REMEMBER:

1. A GOTO statement lets you change the order in which the computer does the instructions in a program.

2. A GOTO statement can create an endless loop, which will make the computer do something over and over again.

3. Use the BREAK key to stop the running of a program.

4. A comma at the end of a PRINT statement makes the computer print in four columns on the screen.

5. A semicolon at the end of a PRINT statement tells the computer to continue printing on the same line.

6. Variables can be used as counters, for example:
10 LET A = A + 1. Each time the computer follows the instructions on line 10, it will take the value of the variable A, add 1 to it and set A equal to this new value.

Program 3
Type

Did you remember to press ENTER after each line? Now type **RUN** and press **ENTER.**

What does line 20 do?

Note that to make the computer print a blank line, type the keyword PRINT with nothing typed after it.

Also note that to make the computer print out spaces, the spaces must be typed as a string between quotation marks.

Change line 10 so that the first S in SPACES lines up with the N in Neat in line 30.

Type **NEW** and press **ENTER.**

Test your programming skills:

1. Make the computer print your name and address as they would appear on an envelope. Print a space between each line.

2. Make the computer print the names of some of your friends.

3. Make the computer print this design using PRINT statements.

```
 .
...
 .
```

4. Make the computer solve four Math homework problems as in Program 2.

REMEMBER:

1. To correct or change a program line, retype the line.

2. A semicolon at the end of a PRINT statement tells the computer to continue printing on the same line.

3. If an expression (for example, 4 + 2) is printed within quotation marks, the computer treats it as a string and prints it exactly as you typed it (in this example, 4 + 2).

4. If an expression (for example, 4 + 2) is printed without quotation marks, the computer will solve the expression and print the answer (in this example, 6).

5. Except for the math symbols in expressions, all letters and symbols are strings and to print them you need to type them within quotation marks.

6. To print a blank line, use a PRINT statement with nothing following it.

7. To print spaces, place them within the quotation marks of a string.

8. Remember to press ENTER at the end of each program line.

Example 3
Type PRINT "18 + 65"

Press the ENTER key. What happened?
The computer should have printed: 18 + 65.
What is the difference between Examples 2 and 3?
Note that when expressions are typed without quotation marks (as in Example 2 above), the computer prints the answers. However, when expressions are typed within quotation marks (as in Example 3 above), the computer prints them exactly as you typed them in. Anything that is typed within quotation marks is called a string.

Example 4
Type PRINT "21*21 = "21*21

Press the ENTER key. What happened?
The computer should have printed: 21*21 = 441

Make the computer print the problem and the answer, as in Example 4, to each of the following problems:

4. What is 73*96?
5. What is 749 – 43?
6. What is 571/86?

Example 5
Type PRINT "MY NAME IS JOHN."

Press the ENTER key. What happened?
The computer should have printed: MY NAME IS JOHN.
Note that when you want to print words or symbols, they must always be within quotation marks. Remember, anything that is typed within quotation marks is called a string.

Test your programming skills:

1. Make the computer print your own messages on the screen.

2. Make the computer do some arithmetic problems for you.

REMEMBER:

1. Always type the keyword PRINT before typing in any numbers, letters, symbols, or expressions that you want printed on the screen. Otherwise you will get an Error message.

2. Numbers can be typed without quotation marks. If an expression such as 4 + 5 is in a PRINT statement without quotation marks, the computer will print the answer.

3. If numbers or expressions are in a PRINT statement within quotation marks, they will be printed exactly as they were typed in. Anything typed within quotation marks is called a string.

4. Except for the math symbols in expressions, all letters and symbols are strings and must therefore be typed within quotation marks.

5. Note that * means multiplied by and / means divided by.

6. The CLEAR key clears the computer screen.

3. The line contains some misplaced or illegal punctuation. Often people have a tendency to punctuate BASIC as they do English. When you are writing a program, do not use any punctuation unless it is required by BASIC.

?NF Error

?NF Error stands for NEXT without FOR.

Here are come common ?NF errors:

1. A NEXT statement is in the program without the corresponding FOR statement.

2. The wrong variable is given in a NEXT statement. For example:

```
10 FOR X = 1 TO 1000
20 NEXT A
```

The variable on line 20 should be X or left off.

3. When you use nested FOR . . .NEXT loops, you have to finish the inside loop first, and then the outside loop. For example:

```
Wrong                  Right
10 FOR X = 1 TO 20     10 FOR X = 1 TO 20
20 FOR B = 1 TO 10     20 FOR B = 1 TO 10
30 NEXT X              30 NEXT B
40 NEXT B              40 NEXT X
```

4. There are more NEXT statements than FOR statements.

?MO Error

?MO Error stands for missing operand.

Here are some common ?MO errors:

1. A variable or value is missing in a LET statement. For example: LET X =
In this case, X must be set equal to a value or a variable.

2. A variable or value is missing in a comparison. For example: 10 IF X < THEN 50. Here we forgot to give the second value in the comparison.

?TM Error

?TM Error stands for type mismatch. This happens when you try to compare a string variable with a numeric value, or a numeric variable with a string value. It also happens when you try to set a string variable equal to a numeric value, or a numeric variable equal to a string value.

Here are some common ?TM errors:

1. LET X = "HELLO"
X is a numeric variable and HELLO has a string value.

2. LET B$ = 4
B$ is a string variable and 4 is a number. A string must b within quotation marks.

?/0 Error

?/0 Error means that you tried to divide by zero, 0, which car not be done.

4. You must press ENTER after you type each program line.

5. To add a program line, type the line and press ENTER. The computer will put the line in the proper place.

6. If you want to change a program line, simply retype it.

7. To erase a line, type the line number and press ENTER. To erase many lines, use DELETE (this will be explained under COMMANDS).

Commands

Commands are one-word instructions that are used in the immediate mode to tell the computer to do something. To use a command, type the command and press ENTER. Commands do not need line numbers.

Here are some of the commands you should know:

RUN	The RUN command tells the computer to start following the instructions of the program in the computer's memory from the beginning.
RUN 50	The RUN command followed by a number tells the computer to begin following the instructions, starting from the given line number, in this case from line 50.
LIST	The LIST command tells the computer to list (or print) the entire program on the screen. If the program is too long to fit on the screen, hold down the SHIFT key and press the @ key to stop the list. Press any key to continue the list.

LIST 80	The LIST command followed by a number tells the computer to list only the given line number, in this case, 80.
LIST 5—10	This will list all lines from 5 to 10, including lines 5 and 10.
LIST 75—	This will list all lines starting from line 75.
LIST —50	This will list all lines up to and including line 50.
NEW	Use this command with caution. It will erase the entire program from memory.
DELETE 30	The DELETE command will erase the instructions on the line number you type in, in this case, line 30.
DELETE 5—10	This command will erase all lines from 5 to 10. including lines 5 and 10.

Type the following program so you can practice these commands. Be careful not to make any typing errors. If you make a mistake, before you press ENTER, use the backspace key. Otherwise retype the line. Remember to press ENTER after each line. Now type **NEW** and press **ENTER**.

Program example
Type

LESSON 1:
Using the PRINT Statement

■You can use the PRINT statement to put any keyboard character on the TRS-80 screen. For example, you can keyboard

```
PRINT "HAVE A NICE DAY!"
```

■Then you push the ENTER key. The computer will display the characters HAVE A NICE DAY! and the cursor will move to the next line on the screen.

■When you write a program with more than one numbered line, you need to press ENTER after each line. Then type RUN to make the computer display your message. For example,

```
10 PRINT "HELLO"
20 END
>RUN
HELLO
```

Writing Output

1. Read the program. Then look at the output and write what is missing on the blank lines.

```
10 PRINT "ONCE UPON A TIME"
20 PRINT "THERE WERE THREE BEARS:"
30 PRINT "THE PAPA BEAR,"
40 PRINT "THE MAMA BEAR,"
50 PRINT "AND THE BABY BEAR."
60 END
```

```
>RUN
ONCE UPON A TIME
_____________________________
_____________________________
THE MAMA BEAR,
_____________________________
```

2. Read the program. Then look at the output and write what is missing on the blank lines. NOTE: Spaces inside the quotation marks count as characters, too.

```
10 PRINT "JOBS TO DO TODAY "
20 PRINT "    CLEAN MY ROOM"
30 PRINT "    DO HOMEWORK"
40 PRINT "    DO LAUNDRY"
50 PRINT "    SHOP FOR FOOD"
60 END
```

```
>RUN
JOBS TO DO TODAY :
    CLEAN MY ROOM
_____________________________
_____________________________
_____________________________
```

3. Look at the output on the screen. Then read the program and fill in the missing lines. NOTE: To leave a blank line on the screen, keyboard PRINT. Then, press ENTER.

```
>RUN
BETWEEN LINES. . .

I SKIPPED THREE LINES.
```

```
10 PRINT "BETWEEN LINES. . ."
20 PRINT
30 _____________________________
40 _____________________________
50 PRINT "I SKIPPED THREE LINES."
60 _____________________________
```

4. Look at the output on the screen. Then read the program and fill in the missing lines.

```
>RUN
DEAR MARY,

    HOW ARE YOU? I AM HAVING
    FUN ON MY VACATION.

        SEE YOU SOON,
            ANITA
```

```
10 _____________________________
20 PRINT
30 PRINT "    HOW ARE YOU? I AM HAVING"
40 _____________________________
50 _____________________________
60 PRINT "          SEE YOU SOON,"
70 _____________________________
80 END
```

5. Read the output on the screen. Then write a program that will produce this output.

```
>RUN
HELLO       HELLO
      HELLO       HELLO
HELLO       HELLO
      HELLO       HELLO

. . . .GOODBYE!
```

```
10 _____________________________
20 _____________________________
30 _____________________________
40 _____________________________
50 _____________________________
60 _____________________________
70 _____________________________
```

6. Read the output on the screen. Then write a program that will produce this output.

```
>RUN

FIVE. . .
FOUR. . .
THREE. . .
TWO. . .
ONE. . . . . .

BLAST OFF!
```

10 _____

20 _____

30 _____

40 _____

50 _____

60 _____

70 _____

80 _____

Problem Solving

7. Write a program which displays the words THE DAYS OF THE WEEK ARE:, skips a line, and lists the days of the week, one day per line. The days should be indented five spaces from the left edge of the screen.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

8. Write a program which displays your name indented six spaces. Then, display the name of your school right below it. The program should then skip two lines and display your school's address indented 10 spaces.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

LESSON 2:
Using Arithmetic Operations

■You can use the PRINT statement to have the computer calculate and display the answer to an arithmetic problem. For example,

```
30 PRINT 28/7
```

displays 4 as the output. Do not use quotation marks when you want the computer to do a calculation and only print the answer.

Writing Output

1. Read the program. Then look at the output and write what is missing on the blank lines. NOTE: The symbol * means "multiply" and / means "divide."

```
10 PRINT 14 + 3
20 PRINT 14 - 3
30 PRINT 8 * 7
40 PRINT 8 * 7 + 2
50 PRINT 30/3
60 END
```

```
>RUN
17
_____
56
_____
10
```

2. Read the program. Then look at the output and write what is missing on the blank lines. NOTE: Notice that a space is left before the computer prints a number.

```
10 PRINT "MULTIPLES OF 6:"
20 PRINT 1 * 6
30 PRINT 2 * 6
40 PRINT 3 * 6
50 PRINT 4 * 6
60 PRINT 5 * 6
70 END
```

```
>RUN
_____
6
_____
18
_____
_____
```

3. Look at the output on the screen. Then read the program and fill in the missing lines. NOTE: Numbers in parentheses are calculated first.

```
>RUN
(10 + 4)/2 =
7

10 + (4/2) =
12

(4 x 3) + (7-2) =
17
```

```
10 _____
20 PRINT (10 + 4)/2
30 PRINT
40 PRINT "10 + (4/2) ="

50 _____
60 PRINT

70 _____
80 PRINT (4 * 3) + (7-2)
90 END
```

4. Look at the output on the screen. Then read the program and fill in the missing lines.

```
>RUN
IF THERE ARE NO PARENTHESES,
DO THE MULTIPLICATION
AND DIVISION FIRST.

5 + 3 x 2 =
11

10-6/3 =
8
```

```
10 _____
20 PRINT "DO THE MULTIPLICATION"

30 _____
40 PRINT

50 _____
60 PRINT 5 + 3 * 2

70 _____
80 PRINT "10-6/3 ="

90 _____
100 END
```

5. Read the output on the screen. Then write a program that will produce this output.

```
>RUN
(10 + 2)-(10/2) =
7

10 - (12/4) X 3 =
1
```

```
10 _____

20 _____

30 _____

40 _____

50 _____

60 _____
```

6. Read the output on the screen. Then write a program that will produce this output. HINT: Use a PRINT statement to divide 24 by some number to obtain each factor.

```
>RUN
SOME FACTORS OF 24 ARE:

8
3
2
4
```

10 _____

20 _____

30 _____

40 _____

50 _____

60 _____

70 _____

Problem Solving

7. Write a program that uses the numbers 2, 4, and 5 in three different number problems (example: 4 + 2 x 5). The program should use PRINT statements to display the problems and the answers.

8. Write a program that lists the squared numbers from 1 squared to 5 squared, using PRINT statements to calculate each square. Display a title for the list first. HINT: To square a number, multiply it by itself.

6. Read the output on the screen. Then write a program that will produce this output.

```
>RUN
COUNTING BY 3:

3      6      9      12
15     18     21     24
27     30     33     36
39     42     45     48
```

10 _____

20 _____

30 _____

40 _____

50 _____

60 _____

70 _____

80 _____

Problem Solving

7. Write a program that displays four arithmetic problems in this form: 17 x 3 = 51. Use a semicolon to join the two sides of each equation. Use the TAB function to start each equation at the fifth column of the line.

8. Write a program that displays the names of twelve students in your school on three lines of the screen, four names to a line. Display a heading first, skip a line, then display the names.

LESSON 5:
Review

Writing Output

1. Read the program. Then look at the output and write what is missing on the blank lines.

```
10  PRINT "MONEY EARNED THIS WEEK:"
20  PRINT
30  PRINT "JOE","JILL","JACK"
40  PRINT "—","——","———"
50  PRINT 5.11,4.57,1.87
60  PRINT 1.72,3.11,5.22
70  PRINT 2.43,2.73,1.14
80  PRINT "—","——","———"
90  PRINT 9.26,8.41,8.23,"TOTALS"
100 END
```

```
>RUN
MONEY EARNED THIS WEEK:

JOE        JILL       JACK
—          —          —
5.11       4.57       1.87
_____________________________
_____________________________
_____________________________
9.26       8.41       8.23       TOTALS
```

Writing Input

2. Look at the output on the screen. Then read the program and fill in the missing lines.

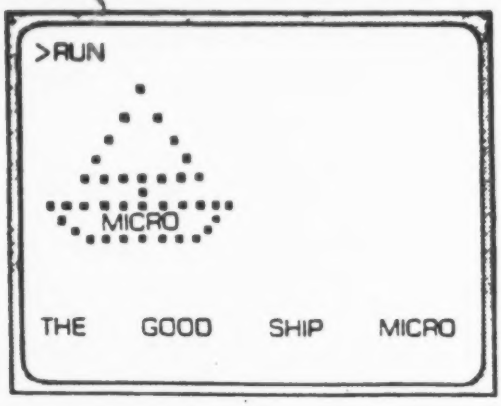
```
>RUN

    **NEWS FLASH**

23 COMPUTERS
HAVE BEEN SPOTTED
DRIVING SOUTH
ALONG HIGHWAY 23!
```

```
10  PRINT
20  _____________________________
30  _____________________________
40  PRINT 25 - 2;
50  _____________________________
60  PRINT "HAVE BEEN ";
70  PRINT "SPOTTED"
80  _____________________________
90  PRINT "ALONG HIGHWAY";
100 PRINT 20 + 3;
110 _____________________________
120 END
```

3. Read the output on the screen. Then write a program that will produce this output.



10 _____

20 _____

30 _____

40 _____

50 _____

60 _____

70 _____

80 _____

90 _____

100 _____

Problem Solving

4. Write a program that draws the outline of a postage stamp, fifteen columns wide and eight lines high. Display a house inside the stamp. At the top of the stamp, display the words U. S. POSTAGE.

5. Write a program that displays five division equations with a rectangle around the whole set. Use the TAB function to indent the entire rectangle so that it starts at the eighth column.

LESSON 8:
Using INPUT Statements

■You can use the INPUT statement to make the computer stop and wait for the person using the program to keyboard in information. For example,

```
60 PRINT "PLEASE TYPE YOUR NAME:"
70 INPUT N$
```

makes the computer display the words PLEASE TYPE YOUR NAME: and place a question mark on the next screen line. The computer then waits until the user inputs the data and presses the ENTER key before executing the rest of the program. The data is stored as the variable N$.

Writing Output

1. Read the program. Then look at the output and write what is missing on the blank lines.

```
10 PRINT "WHAT GRADE ARE YOU IN?"
20 INPUT G
30 LET N = G + 1
40 PRINT "NEXT YEAR YOU WILL BE"
50 PRINT "IN GRADE"; N; "."
60 END
```

```
>RUN
_____________________
?8
_____________________
_____________________
```

2. Read the program. Then look at the output and write what is missing on the blank lines.

```
10 PRINT "NAME AN ANIMAL:"
20 INPUT A$
30 PRINT "NAME ANOTHER ANIMAL:"
40 INPUT B$
50 LET A$ = A$ + "S"
60 LET B$ = B$ + "S"
70 PRINT A$," AND ",B$
80 PRINT "ARE TWO KINDS OF ANIMALS."
90 END
```

```
>RUN
NAME AN ANIMAL:
_____________________
NAME ANOTHER ANIMAL:
_____________________
HORSES AND COWS
_____________________
```

3. Look at the output on the screen. Then read the program and fill in the missing lines.

```
>RUN
GIVE ME A SMALL NUMBER:
?2
GIVE ME A LARGER NUMBER:
?10
THE DIFFERENCE IS 8.
```

```
10 PRINT "GIVE ME A SMALL NUMBER:"
20 _____
30 _____
40 INPUT Y
50 LET D = Y—X
60 _____
70 END
```

4. Look at the output on the screen. Then read the program and fill in the missing lines.

```
>RUN
THINK OF A THREE-LETTER WORD.
TYPE THE FIRST LETTER:
?C
TYPE THE SECOND LETTER:
?A
TYPE THE THIRD LETTER:
?T
YOUR WORD IS CAT.
```

```
10  _____
20  PRINT "TYPE THE FIRST LETTER:"
30  INPUT A$
40  PRINT "TYPE THE SECOND LETTER:"
50  _____
60  PRINT "TYPE THE THIRD LETTER:"
70  _____
80  LET D$ = A$ + B$ + C$
90  _____
100 END
```

5. Read the output on the screen. Then write a program that will produce this output.

```
>RUN
TYPE THREE NUMBERS:
?5
?7
?2
5 x 7 x 2 = 70
5 + 7 + 2 = 14
```

```
10 _____
20 _____
30 _____
40 _____
50 _____
60 _____
70 _____
80 _____
90 _____
```

6. Read the output on the screen. Then write a program that will produce this output.

```
>RUN
TYPE TWO NUMBERS:
?8
?4

N        10 x N      100 x N
-        ------      -------
8        80          800
4        40          400
```

10 _____

20 _____

30 _____

40 _____

50 _____

60 _____

70 _____

80 _____

90 _____

Problem Solving

7. Write a program that asks for three numbers, then calculates, and reports their average.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

8. Write a program that asks the user to type in four words, then displays the words in reverse order from the way they are entered.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

* Answer Key*

ANSWER KEY FOR TRS-80

NOTE: The programs in this workbook will work on the Model I, the Model III, and the Color Computer.

LESSON 1

1. THERE WERE THREE BEARS:
   THE PAPA BEAR,
   AND THE BABY BEAR.

2. DO HOMEWORK
   DO LAUNDRY
   SHOP FOR FOOD

3. 30 PRINT
   40 PRINT
   60 END

4. 10 PRINT "DEAR MARY,"
   40 PRINT " FUN ON MY VACATION."
   50 PRINT
   70 PRINT " ANITA"

5. 10 PRINT "HELLO HELLO"
   20 PRINT " HELLO HELLO"
   30 PRINT "HELLO HELLO"
   40 PRINT " HELLO HELLO"
   50 PRINT
   60 PRINT ". . . .GOODBYE!"
   70 END

6. 10 PRINT "FIVE. . ."
   20 PRINT "FOUR. . ."
   30 PRINT "THREE. . ."
   40 PRINT "TWO. . ."
   50 PRINT "ONE. . . . . ."
   60 PRINT
   70 PRINT "BLAST OFF!"
   80 END

7. 10 PRINT "THE DAYS OF THE WEEK ARE:"
   20 PRINT
   30 PRINT " SUNDAY"
   40 PRINT " MONDAY"
   50 PRINT " TUESDAY"
   60 PRINT " WEDNESDAY"
   70 PRINT " THURSDAY"
   80 PRINT " FRIDAY"
   90 PRINT " SATURDAY"
   100 END

8. 10 PRINT " MY NAME"
   20 PRINT " MY SCHOOL"
   30 PRINT
   40 PRINT
   50 PRINT " MY SCHOOL'S
   ADDRESS"
   60 END

LESSON 2

1. 11
   58

2. MULTIPLES OF 6:
   12
   24
   30

3. 10 PRINT "(10 + 4)/2 ="
   50 PRINT 10 + (4/2)
   70 PRINT "(4 × 3) + (7 − 2) ="

4. 10 PRINT "IF THERE ARE NO
   PARENTHESES,"
   30 PRINT "AND DIVISION FIRST."
   50 PRINT "5 + 3 × 2 ="
   70 PRINT
   90 PRINT 10 − 6/3

5. 10 PRINT "(10 + 2) − (10/2) ="
   20 PRINT (10 + 2) − (10/2)
   30 PRINT
   40 PRINT "10 − (12/4) × 3 ="
   50 PRINT 10 − (12/4) * 3
   60 END

6. 10 PRINT "SOME FACTORS OF 24 ARE:"
   20 PRINT
   30 PRINT 24/3
   40 PRINT 24/8
   50 PRINT 24/12
   60 PRINT 24/6
   70 END

7. 10 PRINT "2 + 4 − 5 ="
   20 PRINT 2 + 4 − 5
   30 PRINT "5 × 4 + 2 ="
   40 PRINT 5 * 4 + 2
   50 PRINT "(4/2) × 5 ="
   60 PRINT (4/2) * 5
   70 END

8. 10 PRINT "SQUARED NUMBERS FROM 1 TO
   5:"
   20 PRINT 1 * 1
   30 PRINT 2 * 2
   40 PRINT 3 * 3
   50 PRINT 4 * 4
   60 PRINT 5 * 5
   70 END

LESSON 3

1. *
   HAPPY BIRTHDAY
   * * * * * * * * * * * * * * * * *

2. BLANK LINE

```
  #   #
  #   #
#       #
```

3.
```
20 PRINT "          @"
40 PRINT "+ + + + + + + + + + +"
50 PRINT "        @           @"
70 PRINT "          @"
```

4.
```
30 PRINT
50 PRINT "    X X       000     000"
70 PRINT                  0"
```

5.
```
10 PRINT "DOES THIS LOOK"
20 PRINT "LIKE A TRUCK"
30 PRINT "TO YOU?          _ _ _ _ _ _ _"
40 PRINT "                :            :"
50 PRINT "             _ _/            :"
60 PRINT "             :               :"
70 PRINT "             _ _ _00_ _ _ _00_ _"
80 END
```

6.
```
10 PRINT "DO YOU WANT TO PLAY?"
20 PRINT
30 PRINT "   00000    K  K"
40 PRINT "   0   0    K K"
50 PRINT "   0   0    KK"
60 PRINT "   0   0    K K"
70 PRINT "   00000    K  K"
80 END
```

NOTE: You may wish to suggest that students use a copy of the TRS Graphic Sheet, found on page 64 of their workbook, to plot their picture before they write the programs for 7 and 8.

7.
```
10 PRINT "*    *  ????"
20 PRINT "*    *  ?   ?"
30 PRINT "*    *  ?   ?"
40 PRINT "*****   ????"
50 PRINT "*    *  ?   ?"
60 PRINT "*    *  ?   ?"
70 PRINT "*    *  ????"
80 END
```

8.
```
10 PRINT "X  X!     !"
20 PRINT "  X !     !"
30 PRINT "X  X!     !"
40 PRINT "_______________"
50 PRINT "    !000!"
60 PRINT "    !0 0!"
70 PRINT "    !000!"
80 PRINT "_______________"
90 PRINT "    !   !"
100 PRINT "    !   !"
110 PRINT "    !   !"
120 END
```

LESSON 4

1. THREE, FOUR, SHUT THE DOOR.
   FIVE, SIX, PICK UP STICKS.
   SEVEN, EIGHT, LAY THEM STRAIGHT.

2. HERE ARE TWO EQUATIONS:
   8 × 5 = 40

3.
```
30 PRINT "JIM", "17", "20", "16"
50 PRINT "ALICE", "15", "22", "17"
60 PRINT "BOB", "20", "18", "16"
```

4.
```
30 PRINT TAB(5); "THREE"
40 PRINT TAB(8); "FOUR"
60 PRINT TAB(3); "SIX"
70 PRINT "SEVEN"
```

5.
```
10 PRINT "THESE ARE HOMOPHONES:"
20 PRINT
30 PRINT "TO", "TOO", "TWO"
40 PRINT "READ", "REED"
50 PRINT "WHO'S", "WHOSE"
60 PRINT "RIGHT", "RITE", "WRITE"
70 END
```

6.
```
10 PRINT
20 PRINT "COUNTING BY 3:"
30 PRINT
40 PRINT 3,6,9,12
50 PRINT 15,18,21,24
60 PRINT 27,30,33,36
70 PRINT 39,42,45,48
80 END
```

NOTE: Be sure students leave a space before the closing quotation marks in lines 10, 30, 50, and 70 so that the problems will be printed correctly when program 7 is run.

7.
```
10 PRINT TAB(5);"78 + 543 = ";
20 PRINT 78 + 543
30 PRINT TAB(5);"56/4 = ";
40 PRINT 56/4
50 PRINT TAB(5);"23 × 45 = ";
60 PRINT 23 * 45
70 PRINT TAB(5);"456 - 234 = ";
80 PRINT 456 - 234
90 END
```

8.
```
10 PRINT "STUDENTS IN MY SCHOOL:"
20 PRINT
30 PRINT "AL", "BETTY", "CAROL", "DAN"
40 PRINT "ELAINE", "FRANK", "GLORIA",
"HOWARD"
50 PRINT "ISADORE", "JUAN", "KARL",
"LAURA"
60 END
```

LESSON 5

1. 1.72 3.11 5.22
   2.43 2.73 1.14
   --- --- ---

2.
```
20 PRINT "        **NEWS FLASH**"
30 PRINT
50 PRINT "COMPUTERS"
80 PRINT "DRIVING SOUTH"
110 PRINT "!"
```

3.
```
10 PRINT "          ."
20 PRINT "        .   ."
30 PRINT "      .       ."
40 PRINT "    ........"
50 PRINT "        ."
60 PRINT ".........."
70 PRINT ". MICRO ."
80 PRINT " ....... "
90 PRINT "THE","GOOD","SHIP","MICRO"
100 END
```

4.
```
10 PRINT " ---------------"
20 PRINT "! U.S. POSTAGE !"
30 PRINT "!          .    !"
40 PRINT "!        .  .   !"
50 PRINT "!      .      .  !"
60 PRINT "!      :      :  !"
70 PRINT "!       -----    !"
80 PRINT " ---------------"
90 END
```

5.
```
10 PRINT TAB (8);"--------------------"
20 PRINT TAB (8);"!      10 5 = 2     !"
30 PRINT TAB (8);"!      35 7 = 5     !"
40 PRINT TAB (8);"!     100 2 = 50    !"
50 PRINT TAB (8);"!      90 9 = 10    !"
60 PRINT TAB (8);"!     200 4 = 50    !"
70 PRINT TAB (8);"--------------------"
80 END
```

LESSON 6

1. 8
   16
   11

2.
```
2   4   6   8
3   6   9   12
4   8   12  16
```

3.
```
30 LET A = 15:LET B = 7
60 PRINT "8 × 10 =";C*D
70 LET E = 24:LET F = 6
```

4.
```
20 PRINT "SUE WORKED";X;"HOURS."
60 PRINT T;"HOURS."
80 PRINT "THEY EARNED";D;"DOLLARS PER HOUR."
100 PRINT "ED EARNED";D * Y;"DOLLARS."
```

5.
```
10 LET X = 10
20 PRINT X,2*X, 3*X,4*X
30 PRINT 5*X, 6*X, 7*X, 8*X
40 PRINT 9*X, 10*X, 11*X, 12*X
50 PRINT 13*X, 14*X, 15*X, 16*X
60 PRINT 17*X, 18*X, 19*X, 20*X
70 END
```

6.
```
10 PRINT "NUMBER", "NUMBER", "TOTAL"
20 PRINT "------"  "------"  "------"
30 LET A = 7:LET B = 5
40 PRINT A,B,A + B
50 LET A = 15:LET B = 2
60 PRINT A,B,A + B
70 LET A = 25
80 PRINT A,A,A + A
90 END
```

7.
```
10 LET L = 11
20 LET W = 8.5
30 LET A = L * W
40 PRINT "THE LENGTH IS";L;"INCHES."
50 PRINT "THE WIDTH IS";W;"INCHES."
60 PRINT "THE AREA IS";A;"SQUARE INCHES."
70 END
```

8.
```
10 LET N = 3
20 PRINT N
30 LET N = 2 * N
40 PRINT N
50 LET N = 2 * N
60 PRINT N
70 END
```

LESSON 7

1. LONG LONG LONG
   THIS IS A LONG LINE.

2. PAINTER
   DRAWER
   DRESSER

3.
```
50 PRINT "    PLEASE SEND ";B$
60 PRINT "    OF POTATOES."
80 PRINT "                ";C$
```

4.
```
40 LET N$ = B$ + D$ + A$ + C$
50 LET P$ = C$ + D$ + A$ + C$ + B$
80 PRINT M$
```

5.
```
10 LET A$ = "I LIKE"
20 LET B$ = "ICE CREAM."
30 LET C$ = "PLUMS.":LET D$ = "PIZZA."
```

```
40 LET E$ = "SHRIMP."
50 PRINT A$;B$
60 PRINT A$;C$
70 PRINT A$;D$
80 PRINT A$;E$
90 END
```

6.
```
10 LET A$ = "HOUSE":LET B$ = "BOAT"
20 LET C$ = "FIRE":LET D$ = "FLY"
30 LET E$ = "PRINT":LET F$ = "OUT"
40 LET X$ = A$ + B$
50 LET Y$ = C$ + D$
60 LET Z$ = E$ + F$
70 PRINT A$,B$,X$
80 PRINT C$,D$,Y$
90 PRINT E$,F$,Z$
100 END
```

NOTE: The order in program 7 will vary, depending on what word is stored in each of the variable names.

7.
```
10 LET A$ = "ZEBRA":LET B$ = "HORSE"
20 LET C$ = "DOG":LET D$ = "CAT"
30 LET E$ = "MOUSE"
40 PRINT D$
50 PRINT C$
60 PRINT B$
70 PRINT E$
80 PRINT A$
90 END
```

8.
```
10 LET A$ = "NANCY":LET B$ = "JULIO"
20 LET C$ = "ALISON":LET D$ = "HOWIE"
30 PRINT A$,B$,C$,D$
40 PRINT D$,C$,A$,B$
50 PRINT B$,A$,D$,C$
60 END
```

5.
```
10 PRINT "TYPE THREE NUMBERS:"
20 INPUT A
30 INPUT B
40 INPUT C
50 LET C = A * B * C
60 LET E = A + B + C
70 PRINT A;"X";B;"X";C;"=";D
80 PRINT A;"+";B;"+";C;"=";E
90 END
```

6.
```
10 PRINT "TYPE TWO NUMBERS:"
20 INPUT X
30 INPUT Y
40 PRINT
50 PRINT "N","10 × N","100 × N"
60 PRINT "-","-------","--------"
70 PRINT X,10*X,100*X
80 PRINT Y,10*Y,100*Y
90 END
```

7.
```
10 PRINT "TYPE THREE NUMBERS:"
20 INPUT A
30 INPUT B
40 INPUT C
50 LET D = (A+B+C)/3
60 PRINT "THE AVERAGE IS ";D;"."
70 END
```

8.
```
10 PRINT "TYPE FOUR WORDS:"
20 INPUT A$
30 INPUT B$
40 INPUT C$
50 INPUT D$
60 PRINT D$
70 PRINT C$
80 PRINT B$
90 PRINT A$
100 END
```

LESSON 8

1. WHAT GRADE ARE YOU IN?
   NEXT YEAR YOU WILL BE
   IN GRADE 9.

2. ?HORSE
   ?COW
   ARE TWO KINDS OF ANIMALS.

3.
```
20 INPUT X
30 PRINT "GIVE ME A LARGER NUMBER:"
60 PRINT "THE DIFFERENCE IS ";D;"."
```

4.
```
10 PRINT "THINK OF A THREE-LETTER
WORD."
50 INPUT B$
70 INPUT C$
90 PRINT "YOUR WORD IS ";D$;"."
```

LESSON 9

1. E
   L
   O

2. LEAVE YOUR UMBRELLA AT HOME.
   TAKE YOUR UMBRELLA.

3.
```
20 INPUT L$
40 IF L$ = "SPANISH" THEN PRINT "BUENOS
DIAS."
```

4.
```
30 PRINT
50 INPUT A
70 PRINT "20 - 8 ="
100 PRINT "YOU GOT";R;"RIGHT."
```

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DIVI/TMJ - TMJ DIVISION
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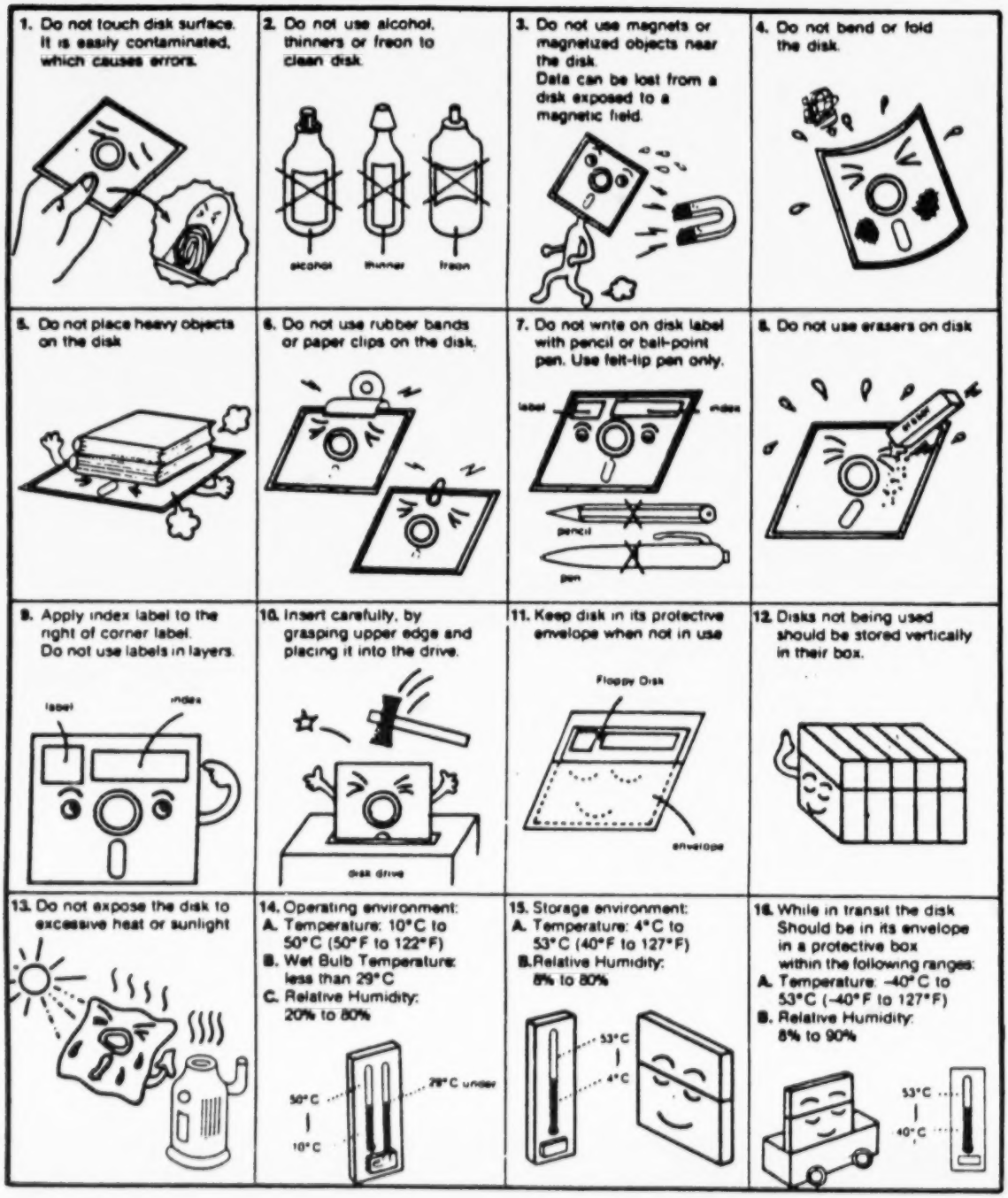

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PRE/POST TEST

Part I - History
(Multiple Choice)

1. The fourth and present day generation of computers uses (vacuum chips, microchips, vacuum tubes).

2. The first generation of computers used (transistors, integrated circuits, vacuum tubes).

3. As each generation of computers changed, computers became (larger and more expensive, smaller and less expensive, smaller and less powerful).

4. The Analytical Engine, the first calculating machine truly called a computer was designed by (Herman Hollerith, Charles Babbage, John Napier).

5. Historically, the number system used by computers in the CPU and memory has been the (binary, decimal, metric) system.

Part II - Social Impact
(Matching)

1.	_____Government	A.	Inventory
2.	_____School	B.	Assembly line
3.	_____Factories	C.	Population Statistics
4.	_____Health Care	D.	Drill and Practice
5.	_____Supermarkets	E.	Monitoring Patients

Part III - Terminology and Functions
(Fill - in the blanks)

New	Hardware	RAM	Software
ROM	List	RUN	ENTER

1. The computer machinery is referred to as _____ and the program for a computer is called _____

2. The _____key is pressed at the end of each statement or each response which is fed into a computer.

3. The memory stored in a computer when it is manufactured is called _____and the memory that can be written into or read from a computer is the _____.

4. To make a computer display the contents of a program, you should type _____, but after a program has been written, the command to make the computer follow the instructions is _____.

5. When you type _____into the computer, the screen will be cleared and the memory of a program will be erased.

Part IV - Application
(True or false)

1. _____Computers are used only in business, industry, or at home.

2. _____If you receive an incorrect statement from a bank, most of the time it is because of computer error.

3. _____Computers will teach us everything we are going to need to learn.

4. _____One inappropriate use of a computer is gathering confidential information from a data base by phone.

5. _____Computers will never be used in dishwashers.

Part V - Programming
(Select One)

1. Write a program to find the area of a rectangle. The user will input the length and width of the rectangle. (Hint - Area = length X width).

2. Write a program that will count by 2's and print the numbers in four columns on the screen.

PRE/POST TEST
ANSWER KEY

Part I - History
(Multiple Choice)

1. The fourth and present day generation of computers uses (vacuum chips, microchips, vacuum tubes).

2. The first generation of computers used (transistors, integrated circuits, vacuum tubes).

3. As each generation of computers changed, computers became (larger and more expensive, smaller and less expensive, smaller and less powerful).

4. The Analytical Engine, the first calculating machine truly called a computer was designed by (Herman Hollerith, Charles Babbage, John Napier).

5. Historically, the number system used by computers in the CPU and memory has been the (binary, decimal, metric) system.

Part II - Social Impact
(Matching)

1. ___C___ Government
2. ___D___ School
3. ___B___ Factories
4. ___E___ Health Care
5. ___A___ Supermarkets

A. Inventory
B. Assembly line
C. Population Statistics
D. Drill and Practice
E. Monitoring Patients

Part III - Terminology and Functions
(Fill - in the blanks)

New	Hardware	RAM	Software
ROM	List	RUN	ENTER

1. The computer machinery is referred to as ___Hardware___ and the program for a computer is called ___Software___.

2. The ___ENTER___ key is pressed at the end of each statement or each response which is fed into a computer.

3. The memory stored in a computer when it is manufactured is called ___ROM___ and the memory that can be written into or read from a computer is the ___RAM___.

4. To make a computer display the contents of a program, you should type ___List___, but after a program has been written, the command to make the computer follow the instructions is ___RUN___.

5. When you type _____NEW_____ into the computer, the screen will be cleared and the memory of a program will be erased.

Part IV - Application
(True or false)

1. ____F_____ Computers are used only in business, industry, or at home.

2. ____F_____ If you receive an incorrect statement from a bank, most of the time it is because of computer error.

3. ____F_____ Computers will teach us everything we are going to need to learn.

4. ____T_____ One inappropriate use of a computer is gathering confidential information from a data base by phone.

5. ____F_____ Computers will never be used in dishwashers.

Part V - Programming
(Select One)

1. Write a program to find the area of a rectangle. The user will input the length and width of the rectangle. (Hint - Area = length X width).

2. Write a program that will count by 2's and print the numbers in four columns on the screen.

Possible Solutions:

1. NEW

```
10 CLS
20 INPUT L
30 INPUT W
40 LET A=L*W
50 PRINT A
60 END
```

1.

```
10 CLS
20 PRINT "LENGTH OF THE RECTANGLE"
30 INPUT L
40 PRINT "WIDTH OF THE RECTANGLE"
50 INPUT W
60 LET A=L*W
70 PRINT "AREA OF THE RECTANGLE="A
80 END
```

2.

```
10 CLS
20 N=0
30 N=N+2
40 PRINT N,
50 GOTO 30
60 END
```